FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554 SEP 2 4 2001

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In the Matter of	)	
Petition of AT&T Communications	)	
of Virginia, Inc., Pursuant	)	
to Section 252(e)(5) of the	)	
Communications Act, for Preemption	)	CC Docket No. 00-251
of the Jurisdiction of the Virginia	)	
State Cooperation Commission	)	
Regarding Interconnection Disputes	)	
with Verizon-Virginia, Inc.	)	
	)	
In the Matter of	)	
Petition of WorldCom, Inc. Pursuant	)	
to Section 252(e)(5) of the	)	
Communications Act for Expedited	)	
Preemption of the Jurisdiction of the	)	CC Docket No. 00-218
Virginia State Corporation Commission	)	
Regarding Interconnection Disputes	)	
with Verizon-Virginia, Inc., and for	)	
Expedited Arbitration	)	
	)	

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3   **SURREBUTTAL TESTIMONY OF STEVEN E. TURNER**

4   **ON BEHALF OF**

5   **AT&T AND WORLDCOM, INC.**

6
7   *PUBLIC VERSION*

8
9
10   September 21, 2001
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1 I. **BACKGROUND AND EDUCATION**

2 Q. **PLEASE STATE YOUR NAME AND ADDRESS.**

3 A. My name is Steven E. Turner. My business address is Kaleo Consulting, 2031 Gold Leaf

4   Parkway, Canton, Georgia 30114.

5 Q. **ARE YOU THE SAME STEVEN E. TURNER WHO FILED DIRECT**
6   **TESTIMONY ON JULY 26, 2001?**

7 A. Yes. My educational and professional experience were identified at that time.

8 II. **SUMMARY OF TESTIMONY**

9 Q. **WHAT IS THE SUBJECT OF YOUR TESTIMONY?**

10 A. I am responding to the testimony of Verizon witness Francis J. Murphy and his criticisms

11   of the use of the Synthesis Model as they relate to trunking issues.

12 Q. **PLEASE SUMMARIZE YOUR TESTIMONY.**

13 A. Mr. Murphy makes several unsupported criticisms related to the interoffice transport

14   network and the trunk calculations found in the Modified Synthesis Model sponsored by

15   AT&T/WorldCom. Mr. Murphy claims that the trunk counts determined by the

16   assumptions in the Modified Synthesis Model will not meet the total trunking demand,

17   resulting in blocking of calls in the network. This is incorrect. Assumptions built into

18   the Modified Synthesis Model accurately determine the number of trunks necessary to

19   provide interoffice transport in Verizon's network. Indeed, the number of trunks

20   provided for in the Modified Synthesis Model is greater than the number of trunks

21   included in Verizon's Common Transport cost study. Mr. Murphy's criticisms about the

22   inability of the Synthesis Model to handle peak day calling is similarly misinformed, as

23   the Modified Synthesis Model uses the same methodology as Verizon to handle peak day

24   traffic. Finally, Mr. Murphy's criticisms related to the Modified Synthesis Model's

1		handling of SONET rings and understatement of the number of ADMs required is totally
2		incorrect and based on misguided engineering assumptions. In short, Mr. Murphy's
3		criticisms related to trunking and transport should be disregarded by this Commission.

III.   THE SYNTHESIS MODEL DOES NOT UNDERSTATE THE NUMBER OF TRUNKS.

4   Q.   **MR. MURPHY ALLEGES THAT THE FCC SYNTHESIS MODEL**
5   **UNDERSTATES THE NUMBER OF REQUIRED TRUNKS BY 18 PERCENT IN**
6   **THE YEAR 2000.[1] DO YOU AGREE?**

7   A.   No. I have reviewed the material provided in response to AT&T/WCOM Request No.

8   10-203, and I cannot find where Mr. Murphy supports the calculation of an 18 percent

9   shortfall in the Modified Synthesis Model.[2] In any event, Mr. Murphy's allegations are

10   incorrect. I reviewed the cost filing Verizon made for its own Common Transport cost

11   study, and the trunk counts that Verizon used are actually *lower* than those found in the

12   Modified Synthesis Model. Specifically, Verizon VA shows ***BEGIN

13   PROPRIETARY   END PROPRIETARYCONFIDENTIAL*** trunks in its

14   Common Transport cost study, which is less than the 605,879 used in the Modified

15   Synthesis Model.[3] As a result, I believe Mr. Murphy's criticism is without merit.

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[1]   Rebuttal Testimony of Francis J. Murphy on behalf of Verizon Virginia Inc., Federal Communications Commission, p. 57 ("Murphy Rebuttal").

[2]   AT&T/WorldCom requested this information in discovery in AT&T/WCOM Request No. 10-203, but have still not received responsive information describing how the 18 percent difference was calculated.

[3]   VA_Part D-2 Com_Trans_Study Workbook, Inputs Worksheet, Sum of Lines 7, 8, 11, 12, 15, and 16.

1 Q. **MR. MURPHY CRITICIZES THE FCC SYNTHESIS MODEL FOR NOT**
2   **ACCOUNTING FOR THE UNIQUE CHARACTERISTICS OF EACH CENTRAL**
3   **OFFICE IN VERIZON'S NETWORK?[4] DO YOU AGREE WITH THIS**
4   **CRITICISM?**

5 A. No. Mr. Murphy describes the calling patterns of a central office in a college town or a

6   resort area and its busy season, busy day, and busy hour. As I demonstrate below – and

7   contrary to Mr. Murphy's claim – busy periods are appropriately considered in the

8   Synthesis Model in modeling the network. The focus of the Synthesis Model includes

9   demand for *all* switching functions and facilities. The characteristics and busy calling

10   periods for switches differ based on geographic and other factors – the busy period for a

11   switch located in an urban commercial center will not be the same as the busy period for

12   a switch that serves suburban and rural areas. The purpose of the Synthesis Model is to

13   model network costs across <u>all</u> of Verizon's switches using calling characteristics

14   indicative of Verizon's use of those switches to determine trunk requirements as well as

15   other cost data. The Modified Synthesis Model develops an *average* cost based on

16   *modeled* central offices. In short, the test of the assumptions and algorithms in the

17   Modified Synthesis Model is not how they compare with one college town or resort area

18   switch, but rather whether they stand up when compared to Verizon's typical switch

19   (including its typical busy hour and required trunking) when engineered efficiently.

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[4]   *Id.* at 50-52.

1	Q.	MR MURPHY CRITICIZES THE SYNTHESIS MODEL FOR ALLEGEDLY
2		ENGINEERING A NETWORK THAT CANNOT HANDLE PEAK CALL
3		VOLUMES.[5] DO YOU AGREE?

4   A.   No, I do not. The inputs used in the FCC Synthesis Model take into account the busy

5   day, and the FCC developed and adopted this methodology after reviewing and

6   considering a variety of alternatives. Moreover, the methodology used is similar to the

7   approach used by Verizon to account for busy day traffic. With the approach described

8   below, the Modified Synthesis Model appropriately handles peak call volumes – contrary

9   to the claims made by Mr. Murphy.

10   The Modified Synthesis Model takes the total traffic for 365 days as found in

11   Verizon's filing of the Dial Equipment Minutes (DEMS) and spreads this across only 270

12   days. As described more fully in my direct testimony (pages 5-7), the division by 270

13   days takes into account the higher call volumes on business days rather than weekend

14   days and distinguishes between a "typical" business days and a "busy" business day. Mr.

15   Murphy criticizes the FCC Synthesis Model for assuming that all business days have the

16   same traffic patterns. This criticism is totally unfounded. By dividing by only 270 days,

17   the Modified Synthesis Model actually accounts for an approximate 27 percent increase

18   in traffic on the "busy" day as compared to a typical business day in determining the

19   trunking requirements and commensurate network cost requirements.[6] In addition, the

20   Modified Synthesis Model applies a "Busy Hour Fraction of Daily Usage" factor to

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[5]   *Id.* at 51.

[6]   In my experience, the difference between a busy day usage and a typical business day usage is
        only around 20 percent, at most. As such, the 270-day factor used in the FCC Synthesis Model
        conservatively estimates the amount of traffic that would occur on the busy day and in the busy
        hour.

1		determine the percentage of daily traffic that occurs during the busy hour. In short, the
2		270-day factor and the Busy Hour Fraction of Daily Usage factor adjust for weekend
3		usage, the difference between typical business day and a "busy" business day usage, and
4		the traffic that occurs on a busy day during the busy hour. The Modified Synthesis
5		Model makes these adjustments to take into account busy hour traffic, and this adjusted
6		figure is used in making the trunk quantity calculations in the Model.
7 8	Q.	**DOES MR. MURPHY TAKE ISSUE WITH THE USE OF THE 10 PERCENT BUSY HOUR FRACTION OF DAILY USAGE FACTOR?**
9	A.	No. Mr. Murphy makes only the general criticism about the alleged inability of the
10		network to handle peak traffic, but does not criticize the 10% busy hour assumption. As I
11		noted in my direct testimony (pages 6-7), this 10% percent assumption is a standard
12		figure used by the industry to estimate the percentage of traffic that occurs during the
13		busy hour.
14 15 16	Q.	**ARE THE MODIFIED SYNTHESIS MODEL ASSUMPTIONS REGARDING THE BUSY HOUR TRAFFIC SIMILAR TO THOSE USED BY VERIZON IN ITS OWN COST STUDY?**
17	A.	Yes. In Verizon's Common Transport cost study, Verizon includes a "Busy Hour to
18		Annual Ratio" that is very similar to the combination of two assumptions used in the
19		Modified Synthesis Model. Verizon uses the "Busy Hour to Annual Ratio" to develop
20		the total number of minutes that will be transmitted across each trunk. Verizon identifies
21		that amount of traffic that it anticipates during the busy hour and then using the "Busy
22		Hour to Annual Ratio" converts this busy hour usage into a total number of minutes.
23		This total number of minutes is then used to determine a cost per minute for Common
24		Transport.

1		According to Verizon Common Transport cost study, the Busy Hour to Annual
2		Ratio is ***BEGIN PROPRIETARY END PROPRIETARY***.[7] The Modified
3		Synthesis Model uses an equivalent factor of 0.000370.[8] In other words, Verizon uses a
4		factor that is only***BEGIN PROPRIETARY END CONFIDENTIAL***
5		lower than the equivalent factor used by the Modified Synthesis Model. Moreover, the
6		fact that Verizon's factor is actually lower than that used by the Modified Synthesis
7		Model means the Modified Synthesis Model produces a larger number of trunks than
8		Verizon's cost study. The bottom line is that Verizon's own cost study is consistent with
9		the assumptions used in the Modified Synthesis Model for the development of the
10		interoffice trunk requirements and totally undercuts Mr. Murphy's criticisms regarding
11		the adequacy of the trunk counts in the Modified Synthesis Model.
12 13 14	**Q.**	**MR. MURPHY CLAIMS THAT THE FCC SYNTHESIS MODEL FAILS TO ACCOUNT FOR THE MODULARITY OF TRUNKS THEREBY CAUSING THE TRUNK COUNTS TO BE UNDERSTATED.[9] IS HE CORRECT?**
15	A.	No. Mr. Murphy's criticisms regarding trunk modularity are wrong for several reasons.
16		*First*, contrary to Mr. Murphy's claims,[10] the Modified Synthesis Model does account for
17		the fact that trunks are added in increments of 24 trunks or an entire DS1. *Second*, Mr.
18		Murphy implies that Verizon's practice of breaking its trunks into smaller groups than
19		does the Modified Synthesis Model has a significant impact in understating the number of

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[7]   "VA_PART D-2 Com_Trans_Study" Workbook, Section "3 Inputs" Worksheet, Line 17.

[8]   This factor can be derived by taking the Modified Synthesis Model "Busy Hour Fraction of Daily Usage" factor of 0.10 and dividing this by 270 days per year.

[9]   Murphy Rebuttal at 58.

1   trunks in the Modified Synthesis Model.[11] Notwithstanding the fact that Verizon's own

2   cost study data indicate that it actually has fewer trunks than are found in the Modified

3   Synthesis Model, Mr. Murphy fails to acknowledge the other Model assumptions that

4   address this issue. Specifically, the Modified Synthesis Model incorporates a fill factor

5   of 90 percent to gross up the number of trunks to account for modularity between various

6   trunk groups. With this fill factor, the Modified Synthesis Model identifies the number of

7   trunks that would be required to serve a central office based on that office's traffic

8   characteristics, and then increases that trunk quantity by 11 percent to account for

9   modularity and other issues. In short, in my opinion, Mr. Murphy's criticisms are

10   incorrect and have no impact on the Modified Synthesis Model.

11   Q.   **MR. MURPHY ALSO TAKES ISSUE WITH WHETHER THE MODIFIED**
12   **SYNTHESIS MODEL ACCURATELY HANDLES ACCESS TRUNK**
13   **REQUIREMENTS.[12] IS HE CORRECT?**

14   A.   No. While Mr. Murphy is correct that access customers actually order the trunks, the

15   driver of the demand for trunks is usage. The Modified Synthesis Model takes the usage

16   characteristics for the quantity of access traffic that is anticipated on Verizon's switches,

17   determines the number of trunks that would be required based on this usage, and then

18   grosses up this quantity of trunks by a fill factor of 90 percent. This approach

19   conservatively estimates the number of trunks that access customers such as IXCs would

20   require on Verizon's switches. Mr. Murphy's claims that the quantity of trunks is "not a

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[10]   *Id.* ("The Model also fails to account for trunk modularity in which current digital technology
       makes it more efficient to install transport in groups of 24 trunks rather than on an individual
       basis as suggested by the Model.")

[11]   *Id.*

1		function of DEMs or Call Completions as assumed by the Modified Synthesis Model" is
2		totally misguided.[13] Any telecommunications company would base its trunk requirements
3		on the volume of minutes and call completions that would be anticipated during the busy
4		hour. This is the approach that has been adopted by the Modified Synthesis Model and is
5		standard practice in the industry. Mr. Murphy's unsubstantiated allegation to the contrary
6		is just that.

7   **Q.**   **MR. MURPHY CLAIMS THAT THE FCC SYNTHESIS MODEL FAILS TO**
8   **TAKE INTO ACCOUNT CAPITAL INVESTMENT FOR THE INSTALLATION**
9   **OF TRUNKS.[14] IS HE CORRECT?**

10   **A.**   No. Installation investments for trunks put into service during the initial installation of a

11   switch are included in the FCC switch price inputs. Thus, Mr. Murphy's criticisms on

12   this point are unfounded.

III.   **RESPONSE TO MR. MURPHY'S SONET CRITICISMS IN THE MODIFIED**
          SYNTHESIS MODEL.

13   **Q.**   **MR. MURPHY ALLEGES THAT THE MODIFIED SYNTHESIS MODEL**
14   **COULD UNDERSTATE THE NUMBER OF SONET ADMS BY 724 ADMS?[15] IS**
15   **HIS ALLEGATION CORRECT?**

16   **A.**   Absolutely not. Even Mr. Murphy appears to recognize that the hypothetical situation he

17   posits is unrealistic when he calls his scenario a "possible high end situation."[16] Simply

18   put, Mr. Murphy develops a SONET ring architecture with 1,293 ADMs that no rational

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[12]   *Id.* at 59.

[13]   *Id.*

[14]   *Id.*

[15]   *Id.* at 61-63.

[16]   *Id.* at *fn.* 60.

1   engineer would ever attempt.[17] Specifically, Mr. Murphy has assumed that in each of the

2   19 *fiber* rings every node on the ring would have a SONET ADM for every SONET ring

3   built for those same nodes. For example, Ring No. 3 in the Modified Synthesis Model

4   has 15 nodes. These 15 nodes constitute a *physical* ring layer in that all 15 nodes are

5   connected by fiber. *It does not mean that all 15 nodes have SONET ADMs for every*

6   *SONET ring that uses the fiber through that node*. In the Modified Synthesis Model,

7   SONET ADMs are added to a small subset of the 15 nodes that the fiber passes through

8   to constitute a SONET ring. Another subset of the 15 nodes will also be equipped with

9   SONET ADMs to constitute another SONET ring. These SONET rings are equipped on

10   the physical layer of the 15 nodes that the fiber passes through until the DS3 demand for

11   the entire 15 offices is met (1,124 DS3s for this particular ring).

12   Mr. Murphy, however, has made the completely unrealistic assumption that every

13   SONET ring that is built must have ADMs deployed in all 15 of the nodes.[18] In my

14   experience both in engineering SONET rings and in reviewing cost studies from other

15   incumbent LECs, I have never seen such an assumption, as it would be incredibly

16   expensive and would result in a utilization rate of the SONET equipment that would be

17   incredibly low.[19] The bottom line is that this Commission should completely ignore Mr.

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[17]   *Id.* at 63.

[18]   Mr. Murphy has multiplied the number of SONET rings required by the number of nodes that are served by that particular fiber ring. *See* Verizon Response to AT&T/WCOM Request No. 10-185, SONET Calculations Folder for the CDROM, Copy of RFCC_switching_io_October1999sonet_adm Workbook, ADM Calculations Worksheet, Column I.

[19]   If 15 SONET ADMs were installed on every SONET ring that was then engineered to support 48 DS3s, each ADM would terminate only 6.4 DS3s (48 DS3s * 2 ADM Ports Per DS3 / 15 ADMs). This quantity of 6.4 DS3s per ADM would lead to a utilization level of only 13.3 percent given
(continued)

1   Murphy's criticism that the Modified Synthesis Model understates the number of required

2   ADMs.

3 **Q.** **MR. MURPHY MAKES TWO OTHER CRITICISMS RELATED TO THE**
4   **INCLUSION OF DCS INVESTMENT IN THE MODIFIED SYNTHESIS MODEL**
5   **FOR INTERCONNECTION PURPOSES.[20] DO YOU HAVE ANY COMMENT**
6   **ON THESE CRITICISMS?**

7 A. Yes. Mr. Murphy has identified two areas where corrections were made to the HAI

8   Model but not carried through to the Modified Synthesis Model. It is my understanding

9   that Mr. Pitkin will be including these corrections in the Modified Synthesis Model

10   submitted with his surrebuttal testimony.

11 **Q.** **DOES THIS CONCLUDE YOUR TESTIMONY?**

12 A. Yes, it does.

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that these ADMs can terminate 48 DS3s. Verizon, in its own interoffice transport cost study, assumed a fill rate of ***BEGIN PROPRIETARY   END PROPRIETARY*** – significantly greater than the fill rate under Mr. Murphy's ill-advised engineering assumptions. Workpaper Part D-2, VA PART D-2 IOF MODEL Workbook, Parameters Worksheet, Row 357.
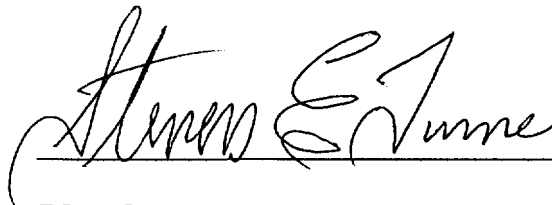
Moreover, Verizon also has indicated that on average it only has ***BEGIN PROPRIETARY END PROPRIETARY*** ADMs per SONET ring. Workpaper Part D-2, VA PART D-2 IOF Eng_SUP Workbook, Cell B14. This number is significantly less than the ill-advised engineering approach used in Mr. Murphy's analysis.

[20]   Murphy Rebuttal at 63-64.

I, _Steven E. Turner_, hereby certify under penalty of perjury that the foregoing

surrebuttal testimony is true and accurate to the best of my knowledge and belief.

September _20_, 2001

[signature]

[Name]